and length of path and apparent velocity of translation. The following particulars are added:

HIGHS.

The highs have come from the region north of Montana, with a single exception, No. VI, which was first noted to the north of Lake Superior. Their translation was generally a little south of east, Nos. III, IV, V, and VI disappearing in the middle Atlantic or merging in the subpermanent high in that region. Nos. I and II moved northeast near the Atlantic Coast, and were last noted off Nova Scotia. There were no notable cold waves accompanying any of these high areas. The greatest fall in temperature in twenty-four hours within the United States was 36°, at Huron p. m. of 5th, while high No. II was situated to the north of Montana. A fall of 34° occurred at Oklahoma a. m. of 12th, while high area No. III was to the north of Montana.

LOWS.

The most remarkable fact about the low areas of this month is the origin of Nos. I, IV, V, VII, VIII, XI, and XII either on the middle Rocky Mountain crest or else a little east of there. These have been especially studied, and will be described at another time. Storms No. III and X were first noted on the north Pacific Coast, Nos. II and VI to the north of Montana, and No. IX in south Texas. Of these storms Nos. VI and X disappeared to the north of Montana or near Manitoba, No. VII to the north of Lake Superior, Nos. XI and XII in the middle Mississippi Valley, and all the rest traversed the Lake Region and disappeared in the Gulf of St. Lawrence or off Newfoundland, where there was a subpermanent low pressure area during the month. The highest wind of the month (76 miles per hour from the west) was reported from Buffalo p. m. of the 12th, while storm No. IV was central in the St. Lawrence Valley. The same station reported 68 miles west on the evening of the 14, as storm No. VI approached the mouth of the St. Lawrence.

The accompanying table presents the principal facts regarding the place of origin and disappearance of these highs and lows.

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long W.	Length.	Duration.	Daily.	Hourly.
High areas.		°	°		°	°	*Miles.*	*Days.*	*Miles.*	*Miles.*
I	1, a. m.	52	114	5, p. m.	45	58	3,470	4.5	771	32.1
II	4, a. m.	54	114	9, a. m.	46	58	2,920	5.0	584	24.3
III	12, a. m.	50	110	15, p. m.	38	77	2,410	3.5	689	28.7
IV	14, a. m.	51	106	17, p. m.	36	74	2,280	3.5	651	27.1
V	20, p. m.	50	114	28, p. m.	35	78	3,220	8.0	404	16.8
VI	28, a. m.	49	85	30, a. m.	34	73	1,200	2.0	600	25.0
Total							15,510	26.5	3,699	
Mean of 6 tracks							2,585	4.4	616	25.7
Mean of 26.5 days									585	24.4
Low areas.										
I	1, p. m.	35	100	4, a. m.	47	61	2,100	2.5	840	35.0
II	3, a. m.	53	114	6, a. m.	49	67	2,800	3.0	932	38.8
III	4, a. m.	52	122	11, a. m.	47	59	4,180	7.0	597	24.9
IV	10, p. m.	39	104	13, p. m.	48	58	2,530	3.0	844	35.2
V	13, p. m.	38	90	15, a. m.	49	55	1,920	1.5	1,280	53.3
VI	14, p. m.	53	117	19, a. m.	52	97	1,240	4.5	275	11.5
VII	18, a. m.	45	107	20, p. m.	48	84	1,520	2.5	607	25.3
VIII	20, p. m.	36	108	23, a. m.	47	63	2,130	2.5	871	36.3
IX	21, p. m.	28	100	26, p. m.	46	58	2,990	5.0	598	24.9
X	26, p. m.	34	111	29, a. m.	35	98	890	2.5	355	14.8
XI	27, a. m.	48	127	29, p. m.	54	109	1,160	2.5	466	19.4
XII	29, a. m.	41	107	*	36	91	920	3.0	308	12.8
Total							24,490	39.5	7,973	
Mean of 12 tracks							2,086	3.3	664	27.7
Mean of 37 days									618	25.7

*April 1, a. m.

LOCAL STORMS.

By A. J. HENRY, Chief of Division of Records and Meteorological Data.

The record of local storms for January, February, and March is as follows:

January 2.—Tornadoes wrecked the small villages of Mooringsport, La., and Benton, Ark., on the afternoon of January 2, 1897. Five people were killed at Mooringsport and 21 were injured; the property loss was about $6,000; path of storm, 300 yards wide; length, unknown; movement, northeast; time, 3.45 p. m., ninetieth meridian. The tornado at Benton, Ark., was much more destructive to property, although but one life was lost. The total property loss was estimated at $12,000 in the town and a much larger sum for the county. Details as to the latter, however, are wanting. The path of the storm was 100 yards wide; length, unknown; movement, northeast; time, about 7 p. m., ninetieth meridian.

The meteorological conditions on the above date were not greatly different from those which generally obtain during the occurrence of tornadoes. A shallow depression covered the west Gulf States, the lowest reduced pressure at 8 p. m., seventy-fifth meridian time, being about 29.80 inches. Rain was falling in Louisiana, Arkansas, Mississippi, and Missouri, and snow, with temperature below freezing, in southern Kansas. The temperature was more than 20° above the normal of the season at Shreveport and Little Rock, the nearest points of observation to the scene of destruction. The barograph curve at Little Rock, about 20 miles northeast of Benton, shows an abrupt rise of about 0.08 inch at the time the tornado struck the last-named place. The increased pressure was maintained for about two hours and fifteen minutes, when an equally abrupt fall occurred, after which the pressure continued to rise and fall in short oscillations of about 0.05 inch amplitude for a period of about fourteen hours.

February 21.—A diminutive tornado was reported to have occurred near Benwood, Clay County, Ind., on the evening of February 21, 1897. The path of the storm was estimated to be about 100 yards wide and 3 miles long. The damage was not great. The meteorological conditions on February 21 were not such as are generally noted in connection with tornadoes. A correspondent of the Bureau writing from Terre Haute, 15 miles southwest of Benwood, says:

> About 8 o'clock Sunday morning (the 21st) the wind suddenly shifted from the south or southwest to the northwest, blowing quite strong, accompanied with round snow, enough to make the ground quite white. At the same time there was a great deal of thunder. In the course of an hour the wind veered to the north and northeast, the snow changing into a cold rainstorm, which continued hard and steady, with very few cessations, until dark. The air was raw and chilly here at Terre Haute all day.

At the time this tornado occurred Benwood was in the northeast quadrant of a somewhat oval-shaped depression that covered Missouri and the west Gulf States. The temperature at Benwood was probably not greatly above 40°, if it reached that figure. Snow was falling in Iowa. The region of warm, moist, southerly winds, so far as can now be ascertained from the daily weather maps, did not reach the southern border of Indiana.

March 5.—Violent squall winds prevailed over north-central Texas, Arkansas, Tennessee, and Kentucky during the 5th. Fifteen buildings were wrecked at Frost, Tex., and 4 persons were injured. Property loss, $4,000. Hope, Ark., also suffered a loss to buildings estimated at $15,000. Damage to roofs and frail structures was reported from a number of places in Tennessee and Kentucky.

March 9.—A severe hailstorm occurred at Evansville, Ind., hail the size of pigeon's eggs fell for five minutes.

March 11.—Hailstones varying in diameter from ¼ to 1¼ inch fell at Nashville, Tenn., for a period of six minutes. The accompanying rainfall was very heavy and, it is said, the fury

of the storm was something unparalleled in the annals of Nashville.

March 12.—High winds at Buffalo and vicinity caused some damage to movable property and frail structures.

March 13.—Another severe hailstorm swept over a narrow path about 200 miles long and probably 5 to 10 miles wide, extending from Fayette County, in the southwestern part of Tennessee, to Smith County, in the east-central part. The towns of Somerville, Bolivar, Decaturville, Centreville, Franklin, Lavergne, Hendersons Crossroads, and Watertown were damaged to a greater or less extent. A smaller storm traversed the counties of Lincoln, Moore, and Coffee, in the southern part of the State, and losses to buildings in the vicinity of Rockhill by severe winds, aggregating $5,000, were reported.

March 19.—On this date minor tornadoes occurred at widely separated places, viz, near Salina, Kans., about 6 p. m., 90th meridian time; near Durant, Iowa, about 4 p. m., 90th meridian time. The area of low pressure was almost directly east of both of these localities. High winds swept over southeastern Louisiana and southwestern Mississippi early in the morning of the 19th. In two cases the evidence seems to point to tornadic action, viz, in the suburbs of Jackson, Miss., and near Utica, Miss. At the latter place 4 persons were killed and 1 injured. Property loss at both places, about $5,000.

March 22.—A minor tornado passed over Arlington, Ga., at 8.30 a. m., wrecking the Arlington Academy, killing 8 of the pupils and injuring 8 others. But little damage was done outside of that building. Total property loss, about $6,000.

March 28.—A general rain and wind storm prevailed over central and southern Texas, the wind being particularly destructive at Austin and Calvert, where, it is estimated, a property loss to the extent of $15,000 was sustained. The loss to railroads on account of washouts and damages to culverts and bridges was also very great.

March 30.—The first severe and destructive tornado of the year occurred at Chandler, Okla., at about 5.30 p. m., 90th meridian time. Fourteen persons were killed and 40 more or less injured. In answer to a request for information as to the character of this storm, a correspondent writes:

As near as I can describe, I would compare it with a stream that is very much swollen with heavy rain, the main current going northeast with whirlpools all over its surface; some of the trees and buildings were apparently mashed flat, others were scattered over large territory; some in the track were lying north, while beside them, or probably across them, would be one lying south, and at times there were places where they lay in all directions in a space of a hundred feet. One place in particular I noticed to-day, the first tree was torn up by the roots and lay with its top west; across that, was one broken off with the top north, and across these two was one with the top east, while a few feet away was one with the top south. This occurred at numerous places. In many places it seemed that shoots would go off to one side and literally rip up the trees with a whirling motion, and finally cease, or the track would be lost. The main storm seemed to keep straight along on the ground and was very destructive. I have no idea of the damage, the storm simply wiped the town of buildings with the exception of probably fifteen, and they were more or less injured. The town was about a mile long and probably not over a quarter wide, and the storm struck it about the center.

Another correspondent, after consulting with conservative business men of the town, estimates the property loss at $100,000. The path of greatest destruction was nearly half a mile wide and at least 10 miles long. How much farther it extended is not known.

March 31.—A tornado passed through portions of Cleveland and Lincoln counties, south-central Arkansas, and a less destructive storm visited Jackson County. Details of both storms are awaited.

Deaths by tornado during January, February, and March, 32; by less violent windstorms, 11; total, 43. Deaths by lightning, 14.

TEMPERATURE OF THE AIR.

[In degrees Fahrenheit.]

Both the mean temperatures and the departures from the normal are given in Table I for the regular stations of the Weather Bureau, which also gives the height of the thermometers above the ground at each station. The mean temperature is given for each station in Table II, for voluntary observers.

The *monthly mean temperatures* published in Table I, for the regular stations of the Weather Bureau, are the simple means of all the daily maxima and minima; for voluntary stations a variety of methods of computation is necessarily allowed, as shown by the notes appended to Table II.

The *regular diurnal period* in temperature is shown by the hourly means given in Table V for 29 stations selected out of 82 that maintain continuous thermograph records.

The *distribution of the observed monthly mean* temperature of the air over the United States and Canada is shown by the dotted isotherms on Chart IV; the lines are drawn over the Rocky Mountain Plateau region, although the temperatures have not been reduced to sea level, and the isotherms, therefore, relate to the average surface of the country occupied by our observers; such isotherms are controlled largely by the local topography, and should be drawn and studied in connection with a contour map.

The *highest mean temperatures* were: Key West, 76.5; Jupiter, 73.2; Corpus Christi, 69.2; Port Eads, 66.4. In Canada, Yarmouth, 31.3; Halifax, 29.8; Sydney, 27.0; St. Johns, N. F., 25.4. The lowest were: Williston, 7.8; Havre, 10.9; Bismarck, 11.8; Moorhead, 15.2; Helena, 15.4. In Canada, Battleford, 3.8; Qu'Appelle, 5.4; Medicine Hat, 6.9; Winnipeg, 7.8.

As compared with the normal for March the mean temperature for the current month was in excess throughout the country east of the Mississippi, but was deficient in the upper Missouri Valley, the Rocky Mountain and Pacific Coast regions. The greatest excesses were: In the United States, New Orleans, 6.9; Jacksonville, 6,8; Mobile, 6.7; Tampa, 6.1. In Canada, Toronto, 5.3; Port Arthur, 4.6; Rockliffe, 4.4; Port Stanley, 4.3; Kingston, 4.1. The largest deficits were: Williston, 17.1; Miles City, 15.4; Helena, 12.6; Bismarck, 12.4; Havre, 10.9. In Canada, Edmonton, and Medicine Hat, 16.6; Calgary, 16.4; Swift Current, 16.1.

Considered by districts the mean temperatures of the current month show departures from the normal as given in Table I. The greatest positive departures were: Florida Peninsula, 4.4; east Gulf, 5.5. The greatest negative departures were: North Dakota, 11.6; northern Slope, 9.0; middle Plateau, 8.5.

In Canada.—Prof. R. F. Stupart says:

The most marked feature of the month was the unusually low temperature which prevailed in the Northwest Territories and British Columbia. In parts of Assiniboia the mean for the month was as much as 20° below average, and in British Columbia it was from 3° to 10° below. Passing eastward in Manitoba, these abnormal conditions became less pronounced; at Winnipeg the average was just maintained, and at the more easterly stations in that province and north of Lake Superior the departure was above instead of below average. In Ontario and Quebec it was from 2° to 5° above, and in the Maritime Provinces differences nowhere great were at some points slightly in excess and at others slightly below the average. (Canadian Weather Map, March, 1897.)

The years of highest and lowest mean temperatures for March are shown in Table I of the REVIEW for March, 1894. The mean temperature for the current month was the highest on record at: Jupiter, 73.2; New Orleans, 69.4; Corpus Christi, 69.2; Jacksonville, 68.8; Pensacola, 66.3; Mobile, 66.2; Montgomery, 63.0; Fort Smith, 54.6. The mean temperature was the lowest on record at: Williston, 7.8; Havre, 10.9; Bismarck, 11.8; Miles City, 15.4; Helena, 21.4; Idaho